Geophysical Research Abstracts
Vol. 17, EGU2015-11526-1, 2015
EGU General Assembly 2015

Evaluation of the Mg doping approach for Si mass fractionation correction on Nu Instruments MC-ICP Mass Spectrometers

Ye Zhao (1), Yu-Te Hsieh (2), and Nick Belshaw (2)

(1) Nu Instruments Ltd, Wrexham Industrial Estate, Wrexham, LL13 9XS, United Kingdom (ye.zhao@nu-ins.com), (2) Dept. of Earth Sciences, University of Oxford, South Parks Road, Oxford, OX1 3AN, United Kingdom (yuteh@earth.ox.ac.uk; nick.belshaw@earth.ox.ac.uk)

Silicon (Si) stable isotopes have been used in a broad range of geochemical and cosmochemical applications. A precise and accurate determination of Si isotopes is desirable to distinguish their small natural variations (< 0.2‰ in many of these studies. In the past decade, the advent of the MC-ICP-MS has spurred a remarkable improvement in the precision and accuracy of Si isotopic analysis. The instrumental mass fractionation correction is one crucial aspect of the analysis of Si isotopes. Two options are currently available: the sample-standard bracketing approach and the Mg doping approach. However, there has been a debate over the validity of the Mg doping approach. Some studies (Cardinal et al., 2003; Engström et al., 2006) favoured it compared to the sample-standard bracketing approach, whereas some other studies (e.g. De La Rocha, 2002) considered it unsuitable.

This study investigates the Mg doping approach on both the Nu Plasma II and the Nu Plasma 1700. Experiments were performed in both the wet plasma and the dry plasma modes, using a number of different combinations of cones. A range of different Mg to Si ratios as well as different matrices have been used in the experiments. A sample-standard bracketing approach has also been adopted for the Si mass fractionation correction to compare with the Mg doping approach. Through assessing the mass fractionation behaviours of both Si and Mg under different instrument settings, this study aims to identity the factors which may affect the Mg doping approach and answer some key questions to the debate.